

BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Study

Region: Pacific

Planning Area(s): Southern California, Oregon

Title: BOEM-MARINe (Multi-Agency Rocky Intertidal Network) (PC-10-02)

BOEM Information Need(s) to be Addressed: Ongoing monitoring of rocky intertidal sites adjacent to OCS production facilities allows BOEM to directly assess potential and/or real impacts to the coastline from OCS operations. With these data, BOEM can directly assess impacts to shoreline resources from OCS activities by differentiating between naturally caused impacts and other anthropogenic impacts, including impacts from OCS oil and gas production and accidental oil spills. The study implements BOEM's OCS Lands Act mandate to monitor the marine and coastal environment adjacent to OCS operations.

Total BOEM Cost: \$1.7 million **Period of Performance:** FY 2010-2015

Conducting Organization: University of California, Santa Cruz

Principal Investigators: Dr. Pete Raimondi, Dr. Jack Engle, Dr. Rich Ambrose, Dr. Jayson Smith, and Dr. Jennifer Burnaford

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Description:

Background: Potential impacts to the shoreline are of particular concern in the Pacific OCS Region because OCS operations are located very close to shore. Public concern with these impacts has a considerable effect on the program. BOEM and its 38 partners in MARINe biannually monitor over 100 established shoreline rocky intertidal sites using a targeted assemblage protocol from California to British Columbia. MARINe partners also use a biodiversity protocol to sample an additional 100 plus sites from Alaska to Mexico on a periodic basis. MARINe employs standardized field protocols and a shared database (www.MARINe.gov). This study provides funding to monitor all 24 BOEM long-term monitoring sites adjacent to OCS operations. In 2012 a cost modification was added to allow for monitoring of 8 long-term sites off the Oregon coast where potential OCS offshore wave and wind energy facilities may be proposed in the near future. The latter 8 sites will be set up in spring/summer 2013. BOEM continues to participate actively in the management and oversight of MARINe, to access the data critical to our ongoing operations, and to fulfill our responsibility to monitor OCS platforms and pipeline operations.

A significant change documented at MARINe sites is the recent finding of juvenile black abalone at selected sites on offshore islands, and the finding of a few individuals off Laguna Beach. These findings, while very encouraging, are not sufficient to offset the need to list the black abalone as endangered (see January 14, 2009, Federal Register Notice). Black abalone, throughout the area affected by withering foot syndrome, are still at low levels (5% of the

original population in the late 1980's and early 1990's) along much of the coastline. While the areal extent affected by withering foot syndrome disease has leveled off, new evidence of the disease is still being found at BOEM sites in San Luis Obispo County. For many years, miles of coastline continued to be affected and the numbers of abalone fell drastically. It appears that the decline in abalone numbers continues due to a combination of loss of animals from withering foot coupled with an absence of recruitment. Evidence of withering foot syndrome was most recently observed in Central California. It seems unlikely the black abalone will recover; one of the problems limiting their recovery is the physical alteration to the community that routinely occurs after the abalone leave. No impacts have been identified from oiling over the recent past, either from OCS or non-OCS operations. An amendment was added September 2013 to add funding provided by NOAA National Marine Fisheries Service for monitoring black abalone critical habitat and to provide additional data and analysis regarding the habitat/elevation of the remaining animals at five locations north of Point Conception.

Partnerships are also fostered with local, State, and Federal government agencies involved in monitoring research. The State is an important user of the BOEM-funded MARINE data in Southern California to determine Marine Life Protected Area designations and monitoring, and to determine impacts to biology in Areas of Special Biological Significance. MARINE data were successfully used to identify ASBS's where the biology is impacted and does not reflect normal conditions. Focused gradient studies are now being conducted to determine if the discharges are the causal agent. MARINE partners interact in technical conferences, government forums, and academic conferences to inform managers about the state of the rocky intertidal.

Objectives: This study provides for the continued monitoring of 32 rocky intertidal sites on the mainland shore immediately adjacent to OCS oil and gas and potential wind and wave facilities. Information generated will provide the basis for evaluating impacts to the shoreline from OCS activities, especially accidental oil spills, and nearshore wave-energy-related effects. A web-based trend analysis of BOEM-funded sites in combination with other MARINE sites in the shared database, along with coordination of MARINE and database tasks are included so that BOEM has access to the data needed for management decisions.

Methods: Sites are monitored biannually by 6 teams of field biologists, including the BOEM PRISM team. Barnacles, mussels, seastars, black abalone, surfgrass, limpets, turf weed, rock weed, and other algae are either photographed in fixed plots in the field, or measured and counted in irregular, circular, or band plots. The sampling protocols are standardized across MARINE and are used by all MARINE field teams. Data is placed in a common database and is reviewed and published by the Science Panel.

As a corollary to the BOEM analysis report, an interactive database was constructed which allows viewers to interactively query the data for custom results. This synthesis was placed on pacificrockyintertidal.org along with information about the sites and trend graphs. This highlights one of the key values of the MARINE partnership. We gain a far better understanding of potential effects from BOEM activities by evaluating the rocky intertidal community across a large spatial and temporal scale.

MARINE received the Partners in Conservation Award from the Secretary of the Interior in

Washington D.C. in October 2012. Dr. Rich Ambrose, Dr. Jack Engle, Mary Elaine Helix, Dr. Steve Murray, and Greg Boland received the award in person on behalf of MARINe.

Current Status: The annual MARINe Meeting was held in August 2013 in Forks, Washington, and was hosted by Olympic National Park, UC Santa Cruz, UC Santa Barbara, and BOEM. Fifty-two attendees representing 33 entities attended. New partners added at that meeting include: California Academy of Sciences, Quileute Indian Nation, Seattle Aquarium, Sitka Sound Science Center, and University of Chicago, Department of Ecology and Evolution. A Citizen Science Workshop was held to discuss the potential for using citizen scientists to employ a simplified species protocol at unfunded sites to supplement MARINe monitoring. One successful site was launched at Sea Ranch this year; three additional pilots are planned for this year, in Washington, central California, and southern California. Memberships of the Steering Committee, Science Panel, and Database Panel have been updated and meetings scheduled for fall 2013. Key items for review this fall include technical review of the updated database, external and internal reviews of the program, and a joint manuscript on the process to determine health of the rocky intertidal.

The new Oregon sites were set up and sampled by summer 2013. Additional physical measurements are being included in this sampling protocol.

Final Report Due: Comprehensive Analysis report completed March 2012.
Final Report due April 2015.

Publications Completed: [See](http://www.eeb.ucsc.edu/pacificrockyintertidal/publications/index)
<http://www.eeb.ucsc.edu/pacificrockyintertidal/publications/index>.

Affiliated WWW Sites: www.MARINe.gov
<http://www.eeb.ucsc.edu/pacificrockyintertidal/index.html>

Revised Date: September 18, 2013